

WHAT IS CLAIMED IS:

1 1. An assembly including a piece to be held in a bore
2 and a device in which the piece is inserted for holding the
3 piece in the bore, wherein the device comprises:

4 a cylindrical sleeve constructed to be inserted into
5 the bore and held therein by engagement of its outer
6 surface with an inner surface of the bore;

7 and a series of fins extending longitudinally of an
8 inner surface of the sleeve and projecting inwardly from
9 the inner surface of the sleeve, the fins being spaced from
10 each other circumferentially of the sleeve with tips
11 disposed to engage an outer surface of a piece inserted
12 into the sleeve,

13 wherein the sleeve and the fins are integrally formed
14 of resilient flexible plastic, the fins are skewed in a
15 same circumferential direction relative to radial planes of
16 the sleeve, the dimension of each fin along the direction
17 of its inward projection is substantially greater than the
18 thickness of the fin, and the flexibility of the fins is
19 such that the fins can be readily deflected when engaged by
20 an inserted piece.

1 2. An assembly according to Claim 1, wherein the fins
2 have longitudinal ends that face longitudinal ends of the
3 sleeve, respectively, and wherein at least one of the
4 longitudinal ends of the fins extends away from the
5 respective longitudinal end of the sleeve and away from the
6 inner surface of the sleeve.

1 3. An assembly according to Claim 2, wherein each fin
2 has trapezoidal longitudinal side surfaces.

1 4. An assembly according to Claim 1, wherein the
2 device is formed of molded plastic and further comprises a
3 plurality of abutments projecting inwardly from the inner
4 surface of the sleeve for engagement with ejector pins of
5 molding apparatus.

1 5. An assembly according to Claim 4, wherein the
2 abutments are spaced inwardly from the longitudinal ends of
3 the sleeve, and the sleeve has slots aligned with the
4 abutments to permit engagement of the ejector pins with the
5 abutments.

1 6. An assembly according to Claim 1, wherein the
2 piece is inserted in the device and has a shank that
3 engages tips of the fins and deflects the fins.

1 7. An assembly according to Claim 6, wherein the
2 piece is a bolt.

1 8. An assembly according to Claim 1, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve.

1 9. An assembly according to Claim 1, wherein the fins
2 extend to the longitudinal ends of the sleeve.

1 10. An assembly according to Claim 1, wherein end
2 portions of the sleeve adjacent to the longitudinal ends of
3 the sleeve, respectively, have an outer diameter that
4 increases away from the respective longitudinal ends of the
5 sleeve.

1 11. An assembly according to Claim 10, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve and said end

4 portions have a substantially uniform inner diameter
5 between the respective longitudinal ends of the sleeve and
6 the fins.

1 12. An assembly according to Claim 10, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve and said end
4 portions have an inner diameter that increases between the
5 respective longitudinal ends of the sleeve and the fins.

1 13. An assembly according to Claim 1, wherein the
2 longitudinal ends of the sleeve are flat.

1 14. An assembly including a piece to be held in a
2 bore and a device in which the piece is inserted for
3 holding the piece in the bore, wherein the device
4 comprises:
5 a cylindrical sleeve;
6 and a series of fins extending longitudinally of an
7 inner surface of the sleeve and projecting inwardly from
8 the inner surface of the sleeve, the fins being spaced from
9 each other circumferentially of the sleeve with tips

10 disposed to engage an outer surface of a piece inserted
11 into the sleeve,

12 wherein the sleeve and the fins are integrally formed
13 of resilient flexible plastic, the fins are skewed relative
14 to radial planes of the sleeve, the flexibility of the fins
15 is such that the fins can be readily deflected when engaged
16 by an inserted piece, and each fin is tapered by having at
17 least one longitudinal end that extends away from a
18 corresponding longitudinal end of the sleeve and away from
19 the inner surface of the sleeve.

1 15. An assembly according to Claim 14, wherein each
2 fin has trapezoidal longitudinal side surfaces.

1 16. An assembly according to Claim 14, wherein the
2 fins are skewed in a same circumferential direction
3 relative to radial planes of the sleeve and the dimension
4 of each fin along the direction of its inward projection is
5 substantially greater than the thickness of the fin.

1 17. An assembly according to Claim 14, wherein the
2 device is formed of molded plastic and further comprises a
3 plurality of abutments projecting inwardly from the inner

4 surface of the sleeve for engagement with ejector pins of
5 molding apparatus.

1 18. An assembly according to Claim 17, wherein the
2 abutments are spaced inwardly from the longitudinal ends of
3 the sleeve, and the sleeve has slots aligned with the
4 abutments to permit engagement of the ejector pins with the
5 abutments.

1 19. An assembly according to Claim 14, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve.

1 20. An assembly according to Claim 14, wherein the
2 fins extend to the longitudinal ends of the sleeve.

1 21. An assembly according to Claim 14, wherein end
2 portions of the sleeve adjacent to the longitudinal ends of
3 the sleeve, respectively, have an outer diameter that
4 increases away from the respective longitudinal ends.

1 22. An assembly according to Claim 21, wherein the
2 longitudinal ends of the fins are spaced from the

3 respective longitudinal ends of the sleeve and said end
4 portions have a substantially uniform inner diameter
5 between the respective longitudinal ends of the sleeve and
6 the fins.

1 23. An assembly according to Claim 21, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve and said end
4 portions have an inner diameter that increases between the
5 respective longitudinal ends of the sleeve and the fins.

1 24. An assembly according to Claim 14, wherein the
2 longitudinal ends of the sleeve are flat.

1 25. An assembly according to Claim 14, wherein the
2 piece is inserted in the device and has a shank that
3 engages tips of the fins and deflects the fins.

1 26. An assembly according to Claim 25, wherein the
2 piece is a bolt.

1 27. In combination, a body having a bore therein, a
2 piece-holding device inserted in the bore, and a piece

3 inserted in and held by the piece-holding device, wherein
4 the piece-holding device comprises:

5 a cylindrical sleeve held in the bore by engagement of
6 its outer surface with an inner surface of the bore;
7 and a series of fins extending longitudinally of an
8 inner surface of the sleeve and projecting inwardly from
9 the inner surface of the sleeve, the fins being spaced from
10 each other circumferentially of the sleeve with tips that
11 engage an outer surface of the piece inserted in the
12 sleeve,

13 wherein the sleeve and the fins are integrally formed
14 of resilient flexible plastic, the fins are skewed in a
15 same circumferential direction relative to radial planes of
16 the sleeve, the dimension of each fin along the direction
17 of its inward projection is substantially greater than the
18 thickness of the fin, and the fins are deflected by
19 engagement with the inserted piece.

1 28. A combination according to Claim 27, wherein the
2 fins have longitudinal ends that face longitudinal ends of
3 the sleeve, respectively, and wherein at least one of the
4 longitudinal ends of the fins extends away from the

5 respective longitudinal end of the sleeve and away from the
6 inner surface of the sleeve.

1 29. A combination according to Claim 28, wherein each
2 fin has trapezoidal longitudinal side surfaces.

1 30. A combination according to Claim 27, wherein the
2 device is formed of molded plastic and further comprises a
3 plurality of abutments projecting inwardly from the inner
4 surface of the sleeve for engagement with ejector pins of
5 molding apparatus.

1 31. A combination according to Claim 30, wherein the
2 abutments are spaced inwardly from the longitudinal ends of
3 the sleeve, and the sleeve has slots aligned with the
4 abutments to permit engagement of the ejector pins with the
5 abutments.

1 32. A combination according to Claim 27, wherein the
2 piece has a shank that engages tips of the fins and
3 deflects the fins.

1 33. A combination according to Claim 32, wherein the
2 piece is a bolt.

1 34. A combination according to Claim 27, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve.

1 35. A combination according to Claim 27, wherein the
2 fins extend to the longitudinal ends of the sleeve.

1 36. A combination according to Claim 27, wherein end
2 portions of the sleeve adjacent to the longitudinal ends of
3 the sleeve, respectively, have an outer diameter that
4 increases away from the respective longitudinal ends of the
5 sleeve.

1 37. A combination according to Claim 36, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve and said end
4 portions have a substantially uniform inner diameter
5 between the respective longitudinal ends of the sleeve and
6 the fins.

1 38. A combination according to Claim 36, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve and said end
4 portions have an inner diameter that increases between the
5 respective longitudinal ends of the sleeve and the fins.

1 39. A combination according to Claim 27, wherein the
2 longitudinal ends of the sleeve are flat.

1 40. In combination, a body having a bore therein, a
2 piece-holding device inserted in the bore, and a piece
3 inserted in and held by the piece-holding device, wherein
4 the piece-holding device comprises:
5 a cylindrical sleeve;
6 and a series of fins extending longitudinally of an
7 inner surface of the sleeve and projecting inwardly from
8 the inner surface of the sleeve, the fins being spaced from
9 each other circumferentially of the sleeve with tips
10 disposed to engage an outer surface of a piece inserted
11 into the sleeve,
12 wherein the sleeve and the fins are integrally formed
13 of resilient flexible plastic, the fins are skewed relative
14 to radial planes of the sleeve, the flexibility of the fins

15 is such that the fins can be readily deflected when engaged
16 by an inserted piece, and each fin is tapered by having at
17 least one longitudinal end that extends away from a
18 corresponding longitudinal end of the sleeve and away from
19 the inner surface of the sleeve.

1 41. A combination according to Claim 40, wherein each
2 fin has trapezoidal longitudinal side surfaces.

1 42. A combination according to Claim 40, wherein the
2 fins are skewed in a same circumferential direction
3 relative to radial planes of the sleeve and the dimension
4 of each fin along the direction of its inward projection is
5 substantially greater than the thickness of the fin.

1 43. A combination according to Claim 40, wherein the
2 device is formed of molded plastic and further comprises a
3 plurality of abutments projecting inwardly from the inner
4 surface of the sleeve for engagement with ejector pins of
5 molding apparatus.

1 44. A combination according to Claim 43, wherein the
2 abutments are spaced inwardly from the longitudinal ends of

3 the sleeve, and the sleeve has slots aligned with the
4 abutments to permit engagement of the ejector pins with the
5 abutments.

1 45. A combination according to Claim 40, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve.

1 46. A combination according to Claim 40, wherein the
2 fins extend to the longitudinal ends of the sleeve.

1 47. A combination according to Claim 40, wherein end
2 portions of the sleeve adjacent to the longitudinal ends of
3 the sleeve, respectively, have an outer diameter that
4 increases away from the respective longitudinal ends.

1 48. A combination according to Claim 47, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve and said end
4 portions have a substantially uniform inner diameter
5 between the respective longitudinal ends of the sleeve and
6 the fins.

1 49. A combination according to Claim 47, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve and said end
4 portions have an inner diameter that increases between the
5 respective longitudinal ends of the sleeve and the fins.

1 50. A combination according to Claim 40, wherein the
2 longitudinal ends of the sleeve are flat.

1 51. A combination according to Claim 40, wherein the
2 piece is a bolt.

1 52. A method of holding a piece in a bore of a body,
2 comprising:
3 providing a piece-holding device having a cylindrical
4 sleeve constructed to be inserted into the bore and held
5 therein by engagement of its outer surface with an inner
6 surface of the bore and having a series of fins extending
7 longitudinally of an inner surface of the sleeve and
8 projecting inwardly from the inner surface of the sleeve,
9 the fins being spaced from each other circumferentially of
10 the sleeve with tips disposed to engage an outer surface of
11 a piece inserted into the sleeve ,

12 wherein the sleeve and the fins are integrally formed
13 of resilient flexible plastic, the fins are skewed in a
14 same circumferential direction relative to radial planes of
15 the sleeve, the dimension of each fin along the direction
16 of its inward projection is substantially greater than the
17 thickness of the fin, and the flexibility of the fins is
18 such that the fins can be readily deflected when engaged by
19 an inserted piece;

20 inserting the piece-holding device in the bore with
21 its outer surface pressed into engagement with an inner
22 surface of the bore; and

23 inserting the piece in the sleeve of the piece-holding
24 device with the outer surface of the piece engaging tips of
25 the fins and deflecting the fins.

1 53. A method according to Claim 52, wherein the piec
2 holding device is inserted in the bore and then the piece
3 is inserted in the device.

1 54. A method according to Claim 52, wherein the piece
2 is inserted in the piece-holding device and then the devic
3 and the piece are inserted in the bore.

1 55. A method according to Claim 52, wherein the fins
2 have longitudinal ends that face longitudinal ends of the
3 sleeve, respectively, and wherein at least one of the
4 longitudinal ends of the fins extends away from the
5 respective longitudinal end of the sleeve and away from the
6 inner surface of the sleeve.

1 56. A method according to Claim 55, wherein each fin
2 has trapezoidal longitudinal side surfaces.

1 57. A method according to Claim 52, wherein the
2 device is formed of molded plastic and further comprises a
3 plurality of abutments projecting inwardly from the inner
4 surface of the sleeve for engagement with ejector pins of
5 molding apparatus.

1 58. A method according to Claim 57, wherein the
2 abutments are spaced inwardly from the longitudinal ends of
3 the sleeve, and the sleeve has slots aligned with the
4 abutments to permit engagement of the ejector pins with the
5 abutments.

1 59. A method according to Claim 52, wherein the piece
2 is a bolt.

1 60. A method according to Claim 52, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve.

1 61. A method according to Claim 52, wherein the fins
2 extend to the longitudinal ends of the sleeve.

1 62. A method according to Claim 52, wherein end
2 portions of the sleeve adjacent to the longitudinal ends of
3 the sleeve, respectively, have an outer diameter that
4 increases away from the respective longitudinal ends of the
5 sleeve.

1 63. A method according to Claim 62, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve and said end
4 portions have a substantially uniform inner diameter
5 between the respective longitudinal ends of the sleeve and
6 the fins.

1 64. A method according to Claim 62, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve and said end
4 portions have an inner diameter that increases between the
5 respective longitudinal ends of the sleeve and the fins.

1 65. A method according to Claim 1, wherein the
2 longitudinal ends of the sleeve are flat.

1 66. A method of holding a piece in a bore of a body,
2 comprising:
3 providing a piece-holding device having a cylindrical
4 sleeve constructed to be inserted into the bore and held
5 therein by engagement of its outer surface with an inner
6 surface of the bore and having a series of fins extending
7 longitudinally of an inner surface of the sleeve and
8 projecting inwardly from the inner surface of the sleeve,
9 the fins being spaced from each other circumferentially of
10 the sleeve with tips disposed to engage an outer surface of
11 a piece inserted into the sleeve,
12 wherein the sleeve and the fins are integrally formed
13 of resilient flexible plastic, the fins are skewed relative
14 to radial planes of the sleeve, the flexibility of the fins

15 is such that the fins can be readily deflected when engaged
16 by an inserted piece, and each fin is tapered by having at
17 least one longitudinal end that extends away from a
18 corresponding longitudinal end of the sleeve and away from
19 the inner surface of the sleeve;

20 inserting the piece-holding device in the bore with
21 its outer surface pressed into engagement with an inner
22 surface of the bore; and

23 inserting the piece in the sleeve of the piece-holding
24 device with the outer surface of the piece engaging tips of
25 the fins and deflecting the fins.

1 67. A method according to Claim 66, wherein each fin
2 has trapezoidal longitudinal side surfaces.

1 68. A method according to Claim 66, wherein the fins
2 are skewed in a same circumferential direction relative to
3 radial planes of the sleeve and the dimension of each fin
4 along the direction of its inward projection is
5 substantially greater than the thickness of the fin.

1 69. A method according to Claim 66, wherein the
2 device is formed of molded plastic and further comprises a

3 plurality of abutments projecting inwardly from the inner
4 surface of the sleeve for engagement with ejector pins of
5 molding apparatus.

1 70. A method according to Claim 69, wherein the
2 abutments are spaced inwardly from the longitudinal ends of
3 the sleeve, and the sleeve has slots aligned with the
4 abutments to permit engagement of the ejector pins with the
5 abutments.

1 71. A method according to Claim 66, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve.

1 72. A method according to Claim 66, wherein the fins
2 extend to the longitudinal ends of the sleeve.

1 73. A method according to Claim 66, wherein end
2 portions of the sleeve adjacent to the longitudinal ends of
3 the sleeve, respectively, have an outer diameter that
4 increases away from the respective longitudinal ends.

1 74. A method according to Claim 73, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve and said end
4 portions have a substantially uniform inner diameter
5 between the respective longitudinal ends of the sleeve and
6 the fins.

1 75. A method according to Claim 73, wherein the
2 longitudinal ends of the fins are spaced from the
3 respective longitudinal ends of the sleeve and said end
4 portions have an inner diameter that increases between the
5 respective longitudinal ends of the sleeve and the fins.

1 76. A method according to Claim 66, wherein the
2 longitudinal ends of the sleeve are flat.

1 77. A method according to Claim 66, wherein the piece
2 is a bolt.

1 78. A method according to Claim 66, wherein the piece
2 holding device is inserted in the bore and then the piece
3 is inserted in the device.

1 79. A method according to Claim 66, wherein the piece
2 is inserted in the piece-holding device and then the device
3 and the piece are inserted in the bore.